

REMARKS/ARGUMENTS

This case has been reviewed and analyzed in view of the Official Action dated 12 July 2005. Responsive to the rejections made in the Official Action, Claims 1, 7 and 11 have been amended to clarify the combination of method steps that define the invention of the subject Patent Application.

In the Official Action, the Examiner rejected Claims 1, 2 and 4 under 35 U.S.C. § 103 as being unpatentable over Conzone et al. (U.S. Patent No. 6,652,972) in view of the admitted prior art. Before discussing the prior art relied upon by the Examiner, it is believed beneficial to first briefly review the method of the invention of the subject Patent Application as now defined in the Claims. The inventive method is directed to a process for bonding flat glasses. The inventive method includes the step of establishing flat glasses having bonding surfaces with a surface precision degree less than $\frac{1}{2} \lambda$. Next, the bonding surfaces of the flat glasses are cleaned (in an ultrasonic solution and a volatile solvent) to remove contaminants and examined with an interferometer to check surface precision of the flat glasses and to insure that no contaminant is on the bonding surfaces. The glasses are then contiguously aligned each to the other devoid of any intermediary composition and then placed in a clamp. The clamp is then tightened until the flat glasses are combined with each other to achieve an optical lens assembly. Finally, the optical lens assembly is separated from the clamp.

In contradistinction, the Conzone et al. reference discloses a different process using different materials. Conzone et al. discloses the method for low temperature joining of similar and/or different phosphate glass by mating at low temperature glass components using an aqueous solution containing phosphorus. The phosphate glasses are polished, cleaned, and brought together with the phosphate-containing solution between the polished surfaces. A vacuum can be used to assist in making the joint. The composite is optionally heat treated to increase strength, chemical durability, and optical performance. Conzone et al. discloses the use of a liquid joining agent, specifically a phosphorus-containing solution, between the bonding surfaces of the phosphorus glasses. Whereas, Applicant's invention provides a method of bonding flat glasses without the use of adhesive or other cohesive substance and only a clamp to precisely and firmly laminate multiple flat glasses into a single optical lens assembly.

It is respectfully submitted that Conzone et al. discloses a method for bonding phosphate glass by using a liquid joining agent. The use of a liquid joining agent, or a cohesive substance, is a conventional method that Applicant has disclosed in the subject Patent Application. Nowhere does the reference disclose or suggest, "...contiguously aligning said flat glasses each to the other devoid of any intermediary composition between said flat glasses ..." as now shown in currently amended Claim 1. In fact, the reference teaches away from Applicant's method, by its use of a cohesive substance, specifically the use of a phosphorus-

containing solution, in order to bond the phosphorus glasses. The method disclosed by Conzone et al. leads to tiny impurities left between two bonding surfaces and reduces the reliability of light transmission. This problem is overcome by the method taught by Applicant in the subject Patent Application.

The admitted prior art does not overcome the deficiencies of Conzone et al. Although the admitted prior art may teach that flat glasses to be bonded together typically have surface precision of $\frac{1}{4} \lambda$, the admitted prior art does not teach the combination of bonding flat glasses without the use of an adhesive or cohesive substance. Obviating the need for a liquid joining agent or an adhesive is a novel aspect taught by Applicant in the subject Patent Application. Although a clamp may be known in the art, the use of the clamp to join the flat glasses without an adhesive or a liquid joining agent is not obvious.

Thus, even if the Conzone et al. reference and the admitted prior art are taken alone or in combination, they do not teach, "...establishing flat glasses having bonding surfaces with a surface precision degree less than $1/2\lambda$..." in combination with "...contiguously aligning said flat glasses each to the other devoid of any intermediary composition between said flat glasses ..." and then in further combination with "...tightening the clamp until the flat glasses are combined with each other..." as is necessary to now amended independent Claim 1. Applicant understands that planar flat glasses having a surface precision degree less than $\frac{1}{2} \lambda$ is known by itself. Aligning glass members next to each other is

known by itself. However, the overall combination of establishing flat glasses, contiguously aligning flat glasses devoid of any intermediary composition and then tightening of the clamp to permit combining of the glasses at a molecular level is not only counterintuitive, it is not seen in the prior art.

In the Official Action, the Examiner rejected Claims 3, 7 and 8 under 35 U.S.C. § 103 as being unpatentable over Conzone et al. in view of the admitted prior art as applied to Claims 1, 2, and 4, and further in view of Peterman, Sr. (U.S. Patent No. 3,409,198) and Ina et al. (U.S. Patent No. 6,521,889). In the rejection, the Examiner states that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the equipment for detecting particles remaining on the surfaces of the glasses of the method of the reference as combined because Conzone et al. and Peterman, Sr. each show that particles interfere with bonding and Peterman, Sr. shows a system for detecting these particles. Furthermore, the Examiner states that Ina et al. teaches that interferometer equipment can detect harmful particles on clean, flat surfaces. The Examiner further reasons that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the interferometer equipment of Ina et al. in the method of the reference as combined because Ina et al. shows that this equipment is commercially available for detecting particles which would interfere with article processing.

Peterman, Sr. is directed to bonding, and more particularly to a bonding method which assures substantially complete bondability between two or more materials. Peterman, Sr. is specifically directed to a method for scanning the surfaces of two or more materials to be bonded prior to actual bonding operations to detect the presence of any contaminants or surface roughness invisible to the eye, and to provide a method of controlling the pre-cleaning and surface preparation operations prior to actual bonding operation. Nowhere does Peterman, Sr. disclose or suggest, "...contiguously aligning said flat glasses each to the other devoid of any intermediary composition between said flat glasses ..." as shown in currently amended Claim 7.

The Ina et al. reference does not overcome the deficiencies of Peterman, Sr., Conzone et al., or the admitted prior art. The Ina et al. reference is directed to a dust particle inspection apparatus, and device manufacturing method. Ina et al is specifically directed to a dust particle inspection apparatus for detecting size information and height information of a dust particle on the surface of a mask or a wafer, as well as a device manufacturing method using the same. Light from a light source is directed to a predetermined surface to be inspected, and reflection light from a dust particle on the predetermined surface is detected by detecting systems. An output signal of the detecting system is processed by a signal processing system, so that size information of the dust particle along the predetermined surface and height information thereof with respect to a direction of

a normal to the predetermined surface are detected. Nowhere does Ina et al. disclose or suggest, "...contiguously aligning said flat glasses each to the other devoid of any intermediary composition between said flat glasses ..." as shown in currently amended Claim 7.

Thus, even if the Peterman, Sr. reference and the Ina et al. reference are taken alone or in combination with Conzone et al. in view of the admitted prior art, they do not teach, "...contiguously aligning said flat glasses each to the other devoid of any intermediary composition between said flat glasses ..." as is necessary to now amended independent Claim 7.

In the Office Action, the Examiner rejected Claims 5 and 9 under 35 U.S.C. § 103 as being unpatentable over Conzone et al. in view of the admitted prior art, Peterman, Sr. and Ina et al. as applied to Claims 3 and 7, and further in view of Gwo. The Examiner states that Gwo teaches that prior to bonding, particles on a surface can be removed with the CO₂ gun or deionized-air cleaning.

Gwo does not overcome the deficiencies of Conzone et al., the admitted prior art, Peterman, Sr., and Ina et al. Gwo is directed to an ultra-precision and reliable bonding method. Gwo discloses the bonding of two materials through hydroxide-catalyzed hydration/dehydration which is achieved at room temperature by applying hydroxide ions to at least one of two bonding surfaces and by placing the surfaces sufficiently close to each other to form a chemical bond between them. Although Gwo may disclose the use of a CO₂ gun or deionized-air cleaning

system, it discloses also the bonding method which uses a liquid solution of hydroxide ions placed on the bonding surfaces. Whereas, Applicant teaches the bonding of flat glasses in a manner that does not require the treating of the surfaces of the glasses with an aqueous solution of hydroxide ions, or any cohesive or adhesive. Therefore, Gwo fails to disclose or suggest, "...contiguously aligning said flat glasses each to the other devoid of any intermediary composition between said flat glasses ..." as shown in currently amended Claims 1 and 7. Furthermore, while it is believed that dependent claims add further patentably distinct limitations, Claims 5 and 9 are at least patentably distinct for the same reasons as Claims 1 and 7 respectively.

In the Official Action, the Examiner rejected Claim 6 and 10 – 12 under 35 U.S.C. § 103 as being unpatentable over Conzone et al. in view of the admitted prior art, Peterman, Sr., Ina et al., and Gwo as applied to Claims 5 and 9, and further in view of Meissner (U.S. Patent No. 5,852,622). Meissner discloses heat treating for bonding that can be as low as 100°C for plastics or higher, which creates a stronger bond, when combining glasses. The Examiner states that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a bonding temperature within the instantly claimed range because Meissner shows that temperatures within this range are chosen dependent upon the materials being bonded and the strength of the bond required.

The Meissner et al. reference does not overcome the deficiencies of Conzone, et al., the admitted prior art, Ina et al., Peterman, Sr., and Gwo as discussed above. Meissner et al. is directed to solid state lasers with composite crystal or glass components. Although Meissner et al. may suggest the heat treating for bonding when combining glasses; the reference does not contemplate the contiguous alignment of the glasses devoid of any intermediary substance as taught by Applicant in the subject Patent Application.

Therefore, even if Meissner et al. is taken alone or in combination, it does not teach, "...contiguously aligning said flat glasses each to the other devoid of any intermediary composition between said flat glasses ..." as shown in currently amended Claim 11.

While it is believed that the dependent claims and further patentably distinct limitations, those claims are at least patentably distinct for the same reasons as independent Claims 1, 7 and 11.

The references cited by the Examiner but not used in the rejection have been reviewed and are believed to be further remote from the subject invention as now defined by the amended claims than that used by the Examiner in his rejection.

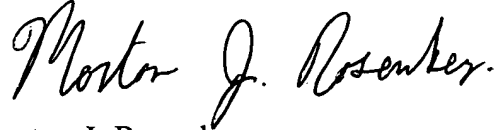
For all the foregoing reasons, it is now believed that the subject Patent Application has been placed in condition for allowance, and such action is respectfully requested.

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Response to Office Action Dated 12 July 2005

Respectfully submitted,
FOR ROSENBERG, KLEIN & LEE

A handwritten signature in cursive script that reads "Morton J. Rosenberg".

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